FACTORS INFLUENCING USE OF INFORMATION COMMUNICATION AND TECHNOLOGY BY TEACHERS IN KENYA: A CASE SECONDARY SCHOOLS IN KASARANI DISTRICT.

BY

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DECLARATION

This Research Report is my original work and has not been presented for award of any degree in any other University.

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This Research Report has been submitted for examination with my approval as the University supervisor.

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DEDICATION

This project research report is dedicated to my parents Mr and Mrs Walter and Grace Nyawanda and my sisters Lilian, Rose, Diana and Brothers Tom, Henry and Dan for their prayers and endless support throughout the study.

May the almighty God bless you abundantly

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ABBREVIATIONS AND ACRONYMS

ICT: Information Communication Technology

IT: Information Technology

SPSS: Statistical Package for Social Sciences

ESP: Economic Stimulus Package

KICD: Kenya Institute of Curriculum Development

PC: Personal Computer

ABSTRACT

This research sought to investigate the factors that influence the use of information communication technology by teachers in Kenyan schools. The factors included types of service automations in schools, level of computer literacy of most teachers, influence of attitude and the availability of training policies in schools. The research was guided by technology acceptance model or theory of planned behaviour to better understand the role of ICT in teaching. The study employed both qualitative and quantitative research design. The target population for the study was 200 teachers in secondary schools in Kasarani District of Nairobi County. The population for the study were top management teachers, middle level teachers and low level management in the seven secondary schools in Kasarani namely: Baba dogo, Kamiti secondary, Kariobangi North.Girls, Starehe girls, kahawa garrison, Our lady of Fatima, Ruaraka High school and garden estate secondary. A sample of 127 teachers was selected at random from the 8 schools for the research study. Primary data was used for the study and the research instruments were questionnaires. The data was analysed using SPSS version 22 and other statistical methods. The response rate was 85.82%. The study revealed that ICT adoption and use by teachers in schools has promoted Job enrichment that has led to increase of decision making competences for teachers involved in some educational processes, further the study also established that ICT Adoption has led to simplified teaching, while others also contend that ICT Adoption and use has led to the improvement of educational processes in the school. The study established that majority of the respondents have reported to be comfortable with use of computer applications in teaching, the study also established that computer effectiveness is a mode of students learning, further the following factors influence on the ICT adoption and use; Intra-organizational agendas, Emotions of teachers and Organizational culture of the schools and how they perceive the use of ICT in teaching. The study finally established that adoption of ICT has with it some consequences, the study established that adoption, acceptance, and adaptation of ICT policies, Organizational assimilation and integration of ICT, Structure of curriculum, Institutional environment and Performance are components of ICT adoption training policies in schools. It is evident that service automation, levels of computer literacy, attitude on computer use, and training policies on ICT influence the use of information communication and technology by teachers in Kenyan schools. The study found out that all the identified factors do influence the use of information communication and technology. Following the finding of this study, therefore, the researcher recommends that there is need to address these factors before and during the process of introducing use of Information communication and technologies in schools. Technological officers taxed with the responsibilities of introducing technologies in schools and teaching should first explore the strengths, limitations or otherwise of these factors in a particular case of teaching before introducing new technologies to the institutions. Computer services through practical on subject demonstrations and practical's should be enhanced.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Learning institutions are currently integrating technology into their teaching, administration and research work due to its usefulness. After several years of effort to embrace technology, Kenyan government promulgated a National Information & Communications Technology (ICT) Policy in January 2006 to improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services (Farrell, 2007). The policy's key strategies pertaining to ICT and education is to encourage the use of ICT in schools, colleges, universities and other educational institutions in the country so as to improve the quality of teaching and learning (MoIC, 2006). However, for learning institutions to successfully integrate and realize the benefit of technology as a learning aid and teaching tool, some level of readiness is required.

The use of technology in learning can be also be referred to as electronic learning (e-learning) which comprises a wide range of applications and processes designed to deliver instruction through electronic means. E-learning signals a paradigm shift in education and its profound effect on education cannot be underestimated. Voogt and Knezek (2008) assert that e-learning is of strategic importance and is an effective method that should be blended into schools' learning mix. With technology evolving at such a rapid rate, it is imperative that teachers and students should be equipped with technical skills to manage e-learning environment. These skills are most effectively gained by learning with technology, rather than about technology (Broadley, 2012). Learning with technology not only requires technical skills, but users of technology should also have the desire to use technology as learning and teaching media.

After several years of effort to embrace technology, Kenyan government promulgated a National Information & Communications Technology (ICT) Policy in January 2006 to improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services (Farrell, 2007). The policy's key strategies pertaining to ICT and education is to encourage the use of ICT in schools, colleges, universities and other educational institutions in the country so as to improve the quality of teaching and learning (MoIC, 2006). However, for learning institutions to successfully integrate and realize the benefit of technology as a learning aid and teaching tool, some level of readiness is required.

The Kenyan government has made effort to initiate e-learning in some public secondary schools. The government through the Ministry of Education (MoE) identified five public secondary schools within each district where e-learning was to be implemented and allocated Sh980 million for their ICT Infrastructure development under the Economic Stimulus Package (ESP) (MoE, 2011b). The selection of ESP beneficiary schools within the district excluded national schools and was based on geographical distribution of schools within a district. The fund was to cater for computers, projector, local area network, internet connectivity and training of teachers. Kenya Institute of Curriculum Development (KICD) has been mandated by the government to provide digital content for e-learning.

E-learning implementation requires physical infrastructure, technical expertise and psychological readiness. E-learning platform can only be managed and used by people with some level of technical skills. In addition to teachers' ICT capacity, Broadley (2012) affirms that, teachers' perception and attitude towards e-learning play a critical role in e-learning implementation. However, for some students, and teachers, e-learning is too easygoing and foreign, and a number of teachers feel that technology takes a lot of control off their hands (Mansour & Mupinga, 2007). It is therefore necessary to examine the users' technical capacity i.e. the teachers and their perception towards technology to ascertain levels of e-learning readiness.

All the funded schools are expected to implement e-learning and the success of e-learning initiatives relies on ICT infrastructure and users' readiness. Though there are various reasons for failures in implementing e-learning projects in public secondary schools, users' technical skills and perception are critical to e-learning implementation. To adopt e-learning, schools should attain some level of physical infrastructure development while e-learning users should have necessary technical competency blended with positive attitudes and perceptions towards e-learning. Therefore, in readiness to adopt e-learning in public secondary schools, this study examined schools' readiness to implement e-learning by exploring teachers' technical competency, and their perception and attitudes towards technology.

1.2 Statement of the problem

Research findings over the past 20 years provide some evidence as to the positive effects of the use of information and communications technology (ICT) on pupils' learning. In spite of such projects, the effects of numerous training programmes and an investment by schools in

information and communications resources, there has been a disappointingly slow uptake in schools. This study sought to examine the factors involved in the take up of information and communications by teachers in schools. It is based on an extensive review of the literature associated with teachers' responses to Information Communication and Technology. It is divided into sections which examine: Types of service automation and their influence on use by teachers in Kenyan schools, Computer literacy, attitude and availability of training policies in schools and how all these affect adoption of Information, Communication and Technology by teachers in Kenyan schools.

In society, Information and Communication Technology (ICT) plays a crucial role, and it is still becoming more important. Over the past 25 years, alongside a series of national and local programmes for the development of Information Communication and Technology in education, there have been research studies of the uptake of Information Communication and Technologyin education.

Many of these studies have shown that in spite of teacher training programmes and an increase in Information Communication and Technologyresources there has been a disappointingly slow uptake of Information Communication and Technology in schools by the majority of teachers in Kenya. A number of early studies investigated why teachers in schools do not use computers in their teaching (Rosen & Weil, 1995; Winnans & Brown, 1992; Dupagne &Krendl, 1992; Hadley & Sheingold, 1993) and they found a list of inhibitors.There are a significant number of factors affecting teachers' use of Information Communication and Technology and subsequent integration of technology into their teaching and learning practices. There being many studies and many gaps in this area of study leads to the need of further research. This study hence sought to find out the factors that influence use of Information Communication and Technology by teachers in schools in Kenya.

1.3 Purpose of the study

The purpose of the study was to investigate the factors that influence of Information Communication and Technology (ICT) by teachers in Kenyan schools.

Objectives of the study

This study was guided by the following objectives:

i. To determine how types of Service Automation in education influence Information Communication and Technology use by teachers in Kenyan schools
ii. To assess how levels of computer literacy influence Information Communication and Technology use by teachers in Kenyan schools.
iii. To determine the extent to which teacher attitude influences Information Communication and Technology use by teachers in Kenyan schools.
iv. To establish the influence of availability of training policies on Information Communication and Technology use by teachers in Kenyan schools.

1.5 Research Questions

The investigated the following research questions:

i. Does service automation in education influence Information Communication and Technology use by teachers in Kenyan schools?
ii. How do the levels of computer literacy influence Information Communication and Technology use by teachers in Kenyan schools?
iii. To what extent does teacher attitude influence Information Communication and Technology use by teachers in Kenyan schools?
iv. How do training policies in schools influence Information Communication and Technology use by teachers in Kenyan schools**?**

1.6 Significance of the Study

It is hoped that the findings and recommendations of this study are expected to provide a process or framework which should assist school heads and/or managers in making decisions on how to adopt and use ICT in school curriculums. The planners and policy makers are expected to use the findings of this study as a basis for revising the current ICT policy in order to overcome the challenges hindering smooth adoption and use of ICT by teachers in schools in Kenya.

It is also hoped that the findings of this study will be useful to teachers as it highlights the challenges they face during adoption and use of ICT in schools. Further, findings of the study are expected to open areas for further study by other researchers and academicians, hence benefiting the whole community at large.

1.7 Delimitation of the study

The study was delimited to the boundaries of Kasarani District. The study was also delimited to teachers who teach in public secondary schools in this district alone. The study was again delimited to the study variables which included: service automation and Information Communication and Technology in Schools, Computer literacy and Information Communication and Technology in Schools, Teacher attitude and Information Communication and Technology in Schools and availability of training policies and Information Communication and Technology in Schools.

1.8 Limitations of the study

Limitations of the study included: costs, the results of the study were limited due to the fact that collection of data involved engaging research assistants whose services would mean spending more money than expected. To curb this limitation the number of assistants were reduced to only two and also the researcher sought the help of some teacher friends from the schools to help deliver the questionnaires to the schools, this reduced the budget. Transport to some of the schools were further away and required using motor bikes which are usually not always very safe or conducive. To help avoid using the motorbikes, a private vehicle belonging to the researcher was used.

Another limitation of the study was that teachers were expected to fill up the questionnaires and return them on time and if they didn't, getting all the questionnaires on time would be a challenge. To reduce the time spent, research assistants were engaged, friends who work in the schools in Kasarani were also engaged in distribution and collection of the questionnaires directly to the teachers this saved on time and ensured that the teachers filled and returned the questionnaires.

1.9 Assumptions of the study

This study assumed that the respondents would give true information. Another assumption of the study is that all the teachers given questionnaires will fill them and give them back.

1.10 Definition of significant terms as used in the Study.

Attitude: The state of mind or feeling by teachers towards using Information Communication and Technology in their teaching. This can be negative, positive or indifferent.

Computer literacy: This is the level of expertise and familiarity one has with computers. In this study it generally refers to the ability of teachers to use computer applications in learning and in teaching the students in classrooms. This also refers to their ability to use applications like word processor, spread sheets, databases and internet.

ICT use: Use of specific Information Communication and Technology tools like computer hardware, and software by teachers in classroom teaching.

Service automation: The process whereby manual services are automated in order to simplify them and make them easier, more efficient and also accurately control the services they offer.

Training policies This refers to the set of ideas, or plans, related to ICT that should be included in curriculum for schools. They are usually officially agreed by either a council, or by relevant managers.

1.11 Organization of the study

The study was organised in five chapters: Chapter One in this study contains background of the study, statement of the problem, objectives of the study, research questions, significance of the study, delimitation and limitations of the study, and assumptions of the study.

Chapter Two presents a review of literature and relevant research details associated with the problem addressed in this study, theoretical framework and conceptual framework and research gaps in the study.

Chapter Three entails the Research methodology used for data collection, research design, target population, sample size and data collection, processing and analysis procedures.

Chapter Four entails the data analysis, presentation, Interpretation and discussion and results of the study that was achieved after the data collection and its analysis.

Chapter Five presents the summary of the findings, conclusions and recommendations and suggestions for further Research studies.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter reviews both theoretical and empirical literature affecting the study topic. The chapter also focuses on the theoretical framework underpinning the study, a conceptual framework and a summary of Knowledge gaps.

2.2 Service Automation and Information, Communication & Technology in Schools

A lack of computers and software can seriously limit what teachers can do in the classroom with regards to integration of Information Communication and Technology. Access to Information Communication and Technology is a first and necessary step in the integration process even though mere access will not automatically lead to use of Information Communication and Technology for teaching and learning. According Campbell (Alampay, 2006) the digital divide refers to "situations in which there is a marked gap in access to or use of Information Communication and Technology devices".

With limited access to electricity and phone lines, few people in Kenya have a computer at home. Radio and television access is much better. On the other hand, mobile phones are commonplace and the number of Internet users is increasing rapidly due to the number of Internet cafés, shops, and access centers that are available, particularly in urban areas. Because English is widely used in Kenya, usage may be affected since most sites on the Internet are in English. The ministry's policy framework indicates that there are a number of challenges concerning access to and use of Information Communication and Technology in Kenya, including high levels of poverty, limited rural electrification, and frequent power disruptions. Most secondary schools have some computer equipment; however, this could consist of one computer in the office of the school head. Very few secondary schools have sufficient Information Communication and Technology tools for teachers and students. Even in schools that do have computers, the student-computer ratio is 150:1.

Most of the schools with Information Communication and Technology infrastructure have acquired it through initiatives supported by parents, the government, NGOs, or other development agencies and the private sector, including the NEPAD e-Schools programme. Attempts to set up basic Information Communication and Technology infrastructure in primary schools are almost negligible.

The core problem is that Kenya lacks adequate connectivity and network infrastructure. Although a small number of schools have direct access to high-speed connectivity through an Internet service provider, generally there is limited penetration of the national physical telecommunication infrastructure into rural and low-income areas. Consequently, there is limited access to dedicated phone lines and high-speed connectivity for e-mail and the Internet. Even where access to high-speed connectivity is possible, high costs remain a barrier to access. As well, very few schools can afford to use VSAT technology. Roughly 10% of secondary schools with computers are able to share teaching resources via a LAN. As a solution to these access problems, the ministry hopes to leverage the e-government initiative of networking public institutions countrywide to facilitate connectivity for the educational sector.

2.3 Computer Literacy and Information, Communication and Technology in Schools

Another crucial barrier to the integration of Information Communication and Technology by teachers in schools is Information Communication and Technology competence or skills and Information Communication and Information Communication and Technologyis their level of confidence in using the technologies. (Dawes, 2000; Larner and Timberlake, 1995; Russell and Bradly, 1997 in Jones, 2004). Jones' review demonstrates that there are close relationships between barriers to the integration of Information Communication and TechnologyLack of personal access, technical problems or lack of teacher Teachers who have little or no confidence in using computers in their work will try to avoid them altogether competence can lead to lack of teacher confidence, but in turn, a lack of confidence could itself magnify the effects of these three barriers (Jones, 2004)The way Information Communication and Technology is used in lessons is influenced by the teachers' knowledge about their subject and how Information Communication and Technology is related to it.

According to Prestride, (2012) computer aided teaching is the most appropriate skill required of a teacher, unfortunately, it is the least possessed by many. This may be because it is barely been part of their training course. According to Andoh, (2012) training should be directed to "using Information Communication and Technology to teach" rather than "learning to use ICT" Prestride, (2012) outlined some of Information Communication and Technologypackages required of a secondary school teacher as data processing, word processing, use of internet, use of spreadsheet, use of presentation software like PowerPoint

and e-mail. TheseInformation Communication and Technologypackages are important to teachers because they assist in creating lesson plans, analysing and setting students' tests, acquiring new knowledge and presenting lesson in a clear way among others. To acquire these skills, teacher educators should prepare teachers properly, as Higgins, & Moseley, (2011) noted, teachers who used Information Communication and Technologytools in classroom might have experimented or observed their own teachers use Information Communication and Technology tools during formative days in initial teachers training institutions.

2.4 Teacher Attitude and Information Communication and Technology in Schools

Research has reported that teacher attitude is one of the most critical factors that enhance or inhibit the integration of Information Communication and Technology into classroom instruction. Teacher attitude and competence ensure Information Communication and Technology implementation and guarantee further Information Communication and Technology innovation. They also help to promote approaches, standards and harmonization of Information Communication and Technology tasks, the awareness Information Communication and Technology equity, utilization and maintenance of ICT, implementation of ICT training, assessment and evaluation, development of ICT, dissemination of pedagogical knowledge, professional development, etc.

According to Fishbein and Ajzen (1975), attitudes refer to the ability topredict a person's behavior toward certain targets. Ajzen (1991) described an attitude as a predisposition to respond favorably or unfavorably to an object, person, or event. The strong relationship of computer related attitudes and computer use in education has been documented in many studies (e.g., Myers & Halpin, 2002; van Braak, 2001). For instance, Myers and Halpin (2002) argued that a major reason for studying teachers' attitudes is that it is a major predictor of classroom ICT use. Attitudes towards computers influence teachers' acceptance of the usefulness of technology, and also influence whether teachers integrate ICT into their classroom (Clark, 2001). Huang and Liaw (2005) also state that among the factors that affect the successful use of computers in the classroom, teachers' attitudes towards computers play a key role. Research of van Braak et al. (2004) also supported that class use of technologies was affected by teachers' attitudes toward computers in education.

At the core of effective integration of ICT in teaching and learning, lie capacities which go beyond mere access and ICT literacy. There is little point in providing large quantities of equipment if teachers do not have the attitudes necessary to change their classroom practices (Ertmer in Jones, 2004). In the West, many researchers move from investigating environmental barriers of access to individual teacher characteristics like beliefs and attitudes (Hermans,Tondeur, van Braak, & Valcke, 2008; Mueller, Wood, Willoughby, Ross, & Specht, 2008). One key area of teachers' attitudes towards ICT is their understanding of how it will benefit their work and their students' learning (Jones, 2004). Cox (2008) expresses the need to measure, among other factors, the teachers' beliefs and understanding of the role of IT within the subject being taught. Kirkup & Kirkwood (2005) distinguish innovators who are enthusiastic for the technology as valuable itself, and later adopters who are less interested in the technology and need evidence that it will improve their lives or work.

Hermans et al. (2008) shed light on the mediating role of teachers' educational beliefs in the resistance and receptiveness to integrate computers in classroom practice. Mumtaz (2000) concludes in a meta-analysis that teachers' theories about teaching are central in influencing teachers to use ICT in their teaching. Teachers' educational beliefs can be barriers to ICT integration (Ertmer in Hermans et al., 2008). Becker (in Hermans etal., 2008) suggests on the other hand that highly active computer users seem to adopt a constructivist position. Findings have been inconsistent though (Chen, 2008; Mueller et al., 2008). Positive attitudes towards ICT or constructivist perspectives on learning will not automatically lead to the uptake of ICT or innovative teaching practice. Judson (2006) suggests that there may be little correlation between stated beliefs and actual practice.

2.5 Training Policies and Information Communication ad Technology in Schools

One of the main obstacles to adoption of ICTs in developing countries in particular, has been identified as ineffective policies in government departments (Kaino, 2004). While much efforts have been made to stipulate ICT policies, not much have been done on the implementation side and especially on the structures and processes in place. For example, the structure of Science and Technology (S&T) policy in Botswana does not specifically stipulate the ICT policy in schools, colleges and other learning institutions/satellites.

Different institutions and departments interpret the policy in various forms for implementation. For example, the Department of Curriculum Development and Evaluation

(DCD&E), (Ministry of Education) develops curricula and translates the policies, and presents them in the school syllabi for implementation. DCD&E is under the Government and Parastatal Institutions in the S&T policy structure. DCD&E stipulates three forms of ICT knowledge involving computers at basic education (primary and junior school levels) and senior school level. From the policy structure, the MoE seems not to be in control of the implementation of the policy and it was the duty of the Ministry of Communication Science and Technology (MCST) to affect the process through government departments. Furthermore, the policy has no gender dimension not only on ICT but on education as a whole. The latter aspect was observed in many countries in the region as shown by data on access, participation and expenditures on education (Kaino, 2007). To realizefull impact of ICTs, educational policies and programs need to be coordinated with those in other ministries, such as economic development, human resource development, Telecommunications, Agriculture, rural and urban development. Countries like Singapore and Finland have national plans for implementing ICTs in education. Typically the plans describe the hardware, software, and networking that will be implemented in schools as well as technical support and training of teachers. The national plans should specify measurable goals, authorize and fund specific programs and projects to advance the vision and provide the resources needed to implement them. The plans should indicate how technology would be coordinated with change in curriculum, pedagogy, assessment, teacher professional development and school restructuring.

Policy leadership is key to any successful development strategy, particularly if these efforts are to contribute to economic and social transformation. For example in Finland, successful development was guide by a clear vision of how the availability of new technologies could increase economic productivity, improve the quality of life and enrich the culture (Kozma, 2005). Normally, ICT is not part of a curriculum; like any other discipline it's a separate subject. Because of this, realistic policies are very important for its integration. Hence, it can be taken ICT as a subject (separated) and ICT in subjects (integrated). ICT policies need to be formulated and planned to complement and support Curricula with technologies infrastructure. Nowadays, in the era of tough competition, nations could no longer depend on traditional approach and stand anymore globalization issues without ICT integration.

2.6 Theoretical Framework

This study adopted The Technology Acceptance Model that was proposed by Ajzen & Fishbein, 1980.The Technology Acceptance Model (TAM) is an information systems theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it, notably: Perceived usefulness (PU) - This was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance". Perceived ease-of-use (PEOU) - Davis defined this as "the degree to which a person believes that using a particular system would be free from effort" (Davis 1989).The TAM has been widely used as the theoretical basis for many empirical studies of user technology acceptance and has partially contributed to understanding users' acceptance of information systems (IS)/information, Communications and technology (ICT) (Taylor & Todd, 1995; Venkatesh & Davis, 2000). Our research shows that many studies focus on the acceptance by students in educational institutions (Chang & Tung, 2008; Pituch & Lee, 2006)

In our model, teachers' PU of the e-learning systems is defined as the perception of degrees of improvement in teaching because of adoption of such a system. PEU of the e-learning systems is the teachers' perception of the ease of adopting e-learning systems in their teaching. Assumptions are made that the more teachers who perceive usefulness of the e-learning systems within an institution, the more positive their acceptance of e-learning systems, consequently increasing their chances for future usage of the e-learning systems in teaching in schools (Arbaugh & Duray, 2002; Pituch & Lee, 2006). Furthermore, technology acceptance is determined by behavioral intention to use (Ajzen & Fishbein, 1980).Therefore, within an institutional context adoption of an e-learning system is a positive function of the intention (BI) to accept the systems.

Some studies use technology acceptance model or theory of planned behaviour in order to understand the use of technology in education. Although those models suggest perceived usefulness and perceived ease of use as critical antecedents to users' technology adoption process, those models are not specific to the use of technology by teachers in schools. This study also draws on Croom & Brandon-Jones (2007), which is found useful to understand key challenges of ICT strategy implementation in government sector. Since its inception, the theory has been adopted by researchers to provide empirical evidence on the relationships

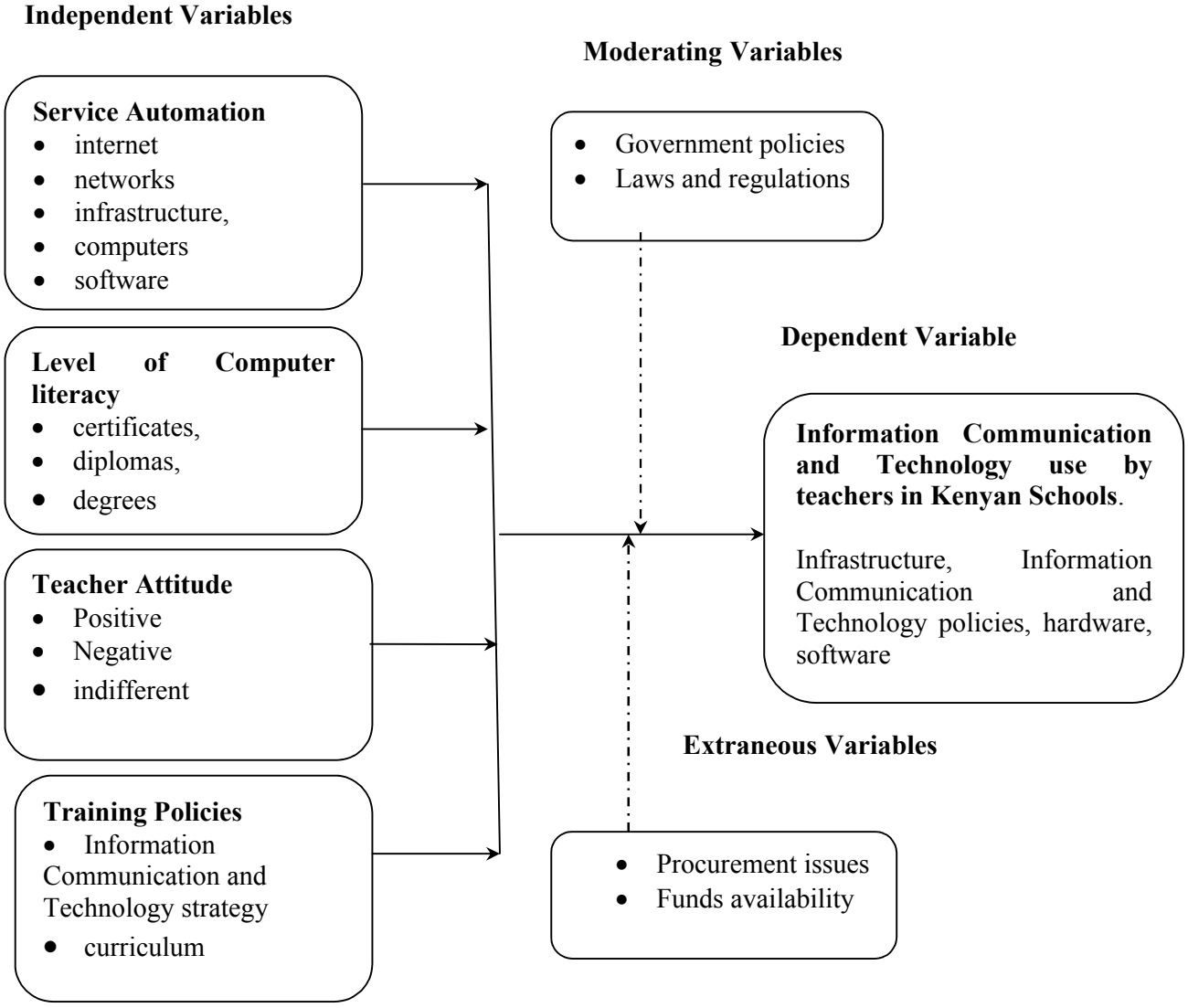
that exist between usefulness, ease of use and system use (Szajna 1994). Kenyan institutions adopt technology for a number of reasons. Such reasons may be to simplify learning, centralize operations, improve quality of service and increase the quality of service delivery among others. The advantage of the improved system is that it has allowed for better instruction and communication between the teachers and their students in classrooms.

ICT adoption and integration play a key role in the education as well as the implementation process. ICT has come with computer applications that help in learning and increasing productivity because they simplify and making learning easier making students learn better and teachers to want to work even more. By providing computers to teachers and students in schools they influence their performance and the final output is improved, this has a positive contribution to the schools and institutions (McGuckin et al 1998). The use of ICT can help teachers in making their lessons easier to understand, allow them to process their work faster and also in gathering information that measures performance, which is most important because you need to measure the performance of teachers and grading of the students. Also computer application is important in determining present performance to pre-established performance norms of students in a class and also of the teachers and the school in general.

2.7 Conceptual Framework

The interrelationships between variables in this study are as shown in the conceptual framework below:

Figure 2.1: Conceptual framework



2.8 Knowledge Gap

The research gap for the study on factors influencing use of Information Communication and Technology by teachers in Kenyan schools was summarised in the table 2.1 below:

Table 2.1 Summary of Knowledge Gap

Variable	Author	Finding	Gap
Service automation	Prestride (2012)	Service automation influences ICT use by teachers	Teachers access to or use of new ICT devices and technology
Computer literacy	Clark, 2001)	majority of the respondents reported to be comfortable with use of computer applications in teaching	Class use of technologies was affected by teachers' attitudes toward computers in education
Teacher attitude	Judson(2006)	Positive attitudes towards ICT or constructivist perspectives on learning will not automatically lead to the uptake of ICT or innovative teaching practice.	Correlation between stated beliefs and actual practice
Training policies	(Kozma,2005)	Policy and leadership is key to any successful development strategy	Adoption, acceptance, and adaptation of ICT policies. Structure of curriculum, as components of ICT adoption training policies in schools

2.9 Summary of the Chapter

This chapter reviewed literature in relation to the factors influencing the use of ICT by teachers in Kenyan schools. It can be deduced from the findings presented from the literature review that there are some key factors that influence or affect teachers' intention of ICT use. The factors identified were service automations, levels of computer literacy in teachers, attitudes of teachers to use of ICT in teaching and availability of training policies in curricula in schools. The context for this research study were teachers in secondary schools and the study attempted to relate some of the findings from literature to the data collected from teachers in the secondary schools in Kasarani District of Nairobi County.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter set out various stages and phases that were to be followed in the collection, measurement and analysis of data. Research design, target population, sampling procedure, and research instruments and data analysis methodology.

3.2 Research Design

The study utilized a descriptive survey design to gather the relevant information. It was a survey aimed at establishing the factors that influence the use of Information Communication and Technology by teachers in Kenyan schools. The design was chosen because it allows for exposure and outcome to be assessed at the same time among individuals (Mugenda and Mugenda, 2003). The research design enables generalization of the findings to a larger population. The main focus of this study was quantitative data, however some qualitative approach was also used in order to gain a better understanding and possibly enable a better and more insightful interpretation of the results from the quantitative study.

3.3 Target Population

The target population was 200 teachers from eight public secondary schools in Nairobi. The study was conducted on teachers in the various secondary schools in Kasarani District of Nairobi County, owing to the fact that teachers play the key role in Education in schools and Kasarani area was easily accessible to me hence making data collection easy.

3.4 Sample Size and Sampling Procedure

This area covered sample size and sampling procedures used in the research study covering the factors that influence Information Communication and Technology use by teachers in Kenyan schools.

3.4.1 Sample Size

The study used a mathematical sampling approach designed by Krejcie and Morgan (1970). This is shown as appendix iv. There were more than 25 teachers per school in Kasarani District of Nairobi County which has 8 schools and so our target population was 200 teachers. Based on the information provided on the Krejcie and Morgan's table, a sample of 127 respondents was picked for the study.

Table3.1 Target Population

Number	school	population
1	Baba dogo	25
2	Kamiti sec.	28
3	Kariobangi N.Girls	25
4	Starehe Girls	26
5	Kahawa garisson	27
6	Our lady of fatima	28
7	Ruaraka	27
8	Garden estate	25
	Total	200

3.4.2 Sampling Procedure

Proportional sampling was done on the teachers from all the 8 schools as shown below on Table 3.2 and based on Krejcie and Morgan's (1970) table for determining sample size, for a given population of 200, a sample size of 127 respondents would be appropriate to adequately represent a cross-section of the population at 95% confidence level.

Table 3.2 Sample size

Number	School	Population	Sample Size
1	Baba dogo	25	16
2	Kamiti sec.	28	18
3	Kariobangi N.Girls	25	16
4	Starehe Girls	26	17
5	Kahawa garisson	27	18
6	Our lady of fatima	28	18
7	Ruaraka	27	18
8	Garden estate	25	16

3.5 Research Instruments

Data was collected using questionnaires. Dwivedi (2008) defines questionnaires as devises for securing answers to questions using a form which the respondent fills in himself or herself. The questionnaires were organised into four sections. The sections consisted of the following section a) Service automations b) Level of computer literacy c) Attitudes and d)

Training policies. The questionnaires were administered to the teachers in all the selected schools in Kasarani. The researcher exercised care and control to ensure all questionnaires issued to the respondents were received. To achieve this, the researcher maintained a register of questionnaires, that were sent, and those that were received.

3.5.1 Pilot Testing

Before being administered to the respondents the data collection instruments comprising of interview guide and questionnaire were tested for validity and reliability. A pilot study was conducted by the researcher to determine the reliability and validity of data collection instruments. Five percent (5%) of the Target population was used as the sample size for the pilot study as suggested by Mugenda & Mugenda (2003) therefore 10 teachers from random schools in Nairobi constituted the sample size for the pilot study. The instruments were administered to the respondents and the information obtained analysed and used to revise the research instruments to ensure that they clearly captured the variables under study allowing for generalization to the entire population. The pilot data was not included in the actual study.

3.5.2 Validity of Data Collection Instruments

The validity perspective of an instrument denotes the instruments ability to measure the possibility of achieving the objectives of the study. Validity therefore would be concerned closely with objectivity of the outcomes or scores. In the determination of the validity of the instruments for this study, Content validity approach was adopted. Content validity refers to a measure of the degree to which data collected using a particular instrument represent a particular domain of indicators of content of a particular concept. To validate the research instruments the researcher sought the opinion of experts in the field of study especially the lecturers and other teachers on content clarity, ambiguity and level of language used so as to ensure the interview guide and questionnaire measure the variables intended for the study. The suggestions provided were used to make the necessary revision and modification of the research instrument thereby enhancing validity.

3.5.3 Reliability of the Instrument

Reliability enhances dependability, accuracy, clarity and adequacy of the instruments. To check the reliability of the instruments Test-retest method was used, this method involved administering the same test twice to the same group of teachers after a week. The scores of the pilot test were then summarized and correlated using Karl Pearson's product moment

correlation which establishes the degree of scatter in a relationship and its strength. The less scattered the variables the stronger the relationship, if r represents the product moment coefficient. The value r lies between -1 and +1

$$r = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{N\Sigma X^2 - (\Sigma X)^2}\sqrt{N\Sigma Y^2 - (\Sigma Y)^2}}$$

Where:

N= number of respondents

X= results of the 1st test

Y= results of the 2nd test

The correlation for the pilot study was 0.93 for the questionnaires and 0.88 for interview guide which was considered to have a strong positive correlation among the different responses this indicated that the instruments were reliable. According to Mugenda & Mugenda (2003) a coefficient of 0.80 or more implies that there is a high degree of reliability of the data.

3.6 Data Collection Procedures

After establishing the validity and reliability of the instruments, an introductory letter was obtained from the Dean, extra mural centre, University of Nairobi which introduced the researcher to head teachers in the selected area of study. To save time and reduce on transport costs, the researcher also used the services of fellow colleagues as research assistants who distributed questionnaires to other teachers. The questionnaires were submitted by hand delivery. The filled questionnaires were collected from the research assistants after one week; thereafter items were edited, coded, and then entered into the computer for analysis. Interviews were conducted by the researcher with selected head teachers and other teachers in the schools. Answers from respondents were immediately filled in the spaces provided on the interview guide. With permission from heads of the institutions, the researcher had a look at the computer laboratories, class rooms and relevant documents. Observations were recorded on spot, coded, tallied, and then later analysed.

3.7 Data Processing and Analysis

Orodho, (2008) observed that data analysis involves some manipulations of data collected through use of statistical tools in order to compute a number or a percentage. In this study,

data was analysed qualitatively and quantitatively using descriptive and inferential statistics. This includes the process of packaging the collected information, putting it in order and structuring main components in a way that the findings are easily and effectively communicated using SPSS version 22. The researcher perused completed questionnaires and document analysis recording sheets. Quantitative data collected was analysed and presented through percentages, standard deviations and frequencies. The information was displayed tallying up responses, computing percentages of variations in response as well as describing and interpreting the data in line with the study objectives and assumptions.

3.8 Ethical Considerations

As Punch (2000) asserts, "all social research involves consent, access and associated ethical issues, since it is based on data from people about people" (75). Interviews of participants will meet the general protocols and procedures for interviewing and oral history (Douglas, Roberts& Thompson (1988)).The study ensured that informed consent was obtained from participants. Some needed full information about the research including the reasons they had been chosen to participate. Participants' privacy, confidentiality and anonymity were guaranteed. Consent forms and a covering letter were provided. Similarly, the schools that were used for the study needed to give permission for any access by their teachers to archival material and documents useful to the study. The schools were assured that findings will be used appropriately, as will their reporting and dissemination.

3.9 Operational Definition of variables

Table 3.3 shows the various variables of study, their indicators and the scales of measurements

Table 3.3: Operationalization of Variables

Objective	Type of variable	Indicators	Measurement Scale	Research Instrument	Methods of data analysis
To determine how types of service automations in education influence Information Communication and Technology use by teachers in Kenyan schools.	**Independent Variable** Service automation	Internet, networks, Infrastructure, Computers, software	nominal Ordinal scale	Questionnaire,	Descriptive statistics; Percentages, frequencies, tables, charts, MS Excel and SPSS
To find out most teachers' levels of computer literacy and how they influence Information Communication and Technology use by teachers in Kenyan schools	Level of Computer literacy	Certificates, diplomas, degrees	Nominal scale	Questionnaire,	Descriptive statistics; Percentages, frequencies, tables, charts,
To investigate if attitudes influence Information Communication and Technology use by teachers in Kenyan schools.	Attitude	Positive, negative, in difference	Nominal scale	Questionnaire,	Inferential statistics Correlation
To establish the availability of training policies in schools and their influence on Information Communication and Technology use by teachers in Kenyan schools.	Information Communication and Technology Strategy, curriculum	Availability, non-availability	Nominal scale	Questionnaire,	Descriptive Mean Standard deviation
	Dependent Variable Information Communication and Technology use by teachers in Kenyan schools	Infrastructure, ICT policies, hardware, software	Nominal scale	Questionnaire,	Descriptive Mean Standard deviation

CHAPTER FOUR
DATA ANALYSIS PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents the data analysis, presentation and interpretation. In addition, the chapter discusses the findings from the research questions that were under investigation. To determine how types of service automation in education influence ICT use by the teachers, the study also investigated the influence of computer literacy, attitude and availability of training policies and their influence on ICT use by teachers in Kenya.

4.2 Questionnaire Response Rate

Out of the 127 Questionnaires that were issued to the students, 109 of the Questionnaires were correctly filled and returned. This represented a response rate of 85.82% which is an acceptable rate (Mugenda & Mugenda, 2003). Only 18 Questionnaires were not returned, giving a non response rate of 14.17%.

4.3 Demographic Characteristics of Respondents

This was basically the information on the population interviewed in this study. It is the demographic characteristics of the sampled population. The research sample included the demographic characteristics of the sampled population. This section has analysed gender issues which was male or female teachers, age of the respondents, number of years worked in the institution and the position the teacher hold in the organization i.e. management, mid or low level groups for all the respondents in the study. The following have been discussed:

4.3.1 Distribution of Respondents by Gender

The study sought to establish the gender of the respondents, it was important to find out the gender of the respondent i.e. male or female in order to establish if this influenced their thinking. Table 4.1 shows the data collected on the gender of the respondents;

Table 4.1 Distribution of Respondents by Gender

Gender	Frequency	Percentage
Male	67	61.47
Female	42	38.53
Total	**109**	**100.00**

From the findings as shown above, majority 67% of the respondents were Male, while 42% of the respondents were female implying that majority of the respondents were male. This meant that our findings were mainly based on male respondents.

4.3.2 Distribution of the Respondents by Age

The respondent's age was important in the study in order to access if the age influenced their response. The study also sought to establish the age of the respondents and the data collected were shown in the Table 4.2

Table 4.2 Distribution of Respondents by Age

Age	frequency	Percentage
26-35	67	61.47
36-45	17	15.60
46-50	15	13.76
Above 50	10	9.17
Total	**109**	**100**

From the data collected as shown in the Table 4.2,the findings revealed that majority 61.47% of the respondents were aged between 26-35years, 15.60% of the respondents were aged between 36-45years, 13.76% of the respondents were aged between 46-50 years while 9.17% of the respondents were aged above 50 years. From the findings it can be implied that majority of the respondents were aged between 26-35 years.

4.3.3 Distribution of the respondents according to Years worked

The study further sought to establish the years worked in the organization by the respondents and find out if this influenced their response. The data collected were shown in the Table 4.3

Table 4.3 Years Worked in the Organization

Years worked	frequency	Percentage
Below 1year	38	34.86
Between 1-2years	42	38.53
Between 3-5 years	19	17.43
Over 5years	10	9.17
Total	**109**	**100**

From the data collected, the findings revealed that majority38.53% of the respondents have worked in the organization between 1-2 years, 34.86% of the respondents had worked in the company below 1year.17.43% of the respondents had worked in the company for a period between 3-5years, 9.17% of the respondents had worked for over 5years. By implications majority of the employees had been working in the organization for a period between 1-2 years.

4.3.4 Distribution of the respondents according to their Positions

The study sought to establish the respective positions held by the respondents the data collected were shown in the table 4.4 below

Table 4.4 Position in the Organization

Position in the Organization	frequency	Percentage
Top management	23	21.10
Middle level	48	44.04
Junior Staff	38	34.86
TOTAL	**109**	**100.00**

From the findings, majority 44.04% of the respondents were attached to the middle level management, 34.86% of the respondents were junior staff, while 21.10% of the respondents were attached to the Top management level. Implying that majority of the respondents was attached to the middle level of management.

4.4 Position in the Organization

4.4.1 Effects of Information Communication and Technology Adoption

The study sought to establish the effects of Information Communication and Technology Adoption, the data collected were shown in the table 4.5 below;

Table 4.5 ICT Adoption and Use

Information Communication and Technology and Use	Mean	STD Dev.
simplified teaching	3.97	1.058
Improvement of educational processes in the school	3.89	1.904
Job enrichment increase of decision making competences for teachers involved in some processes	4.02	0.907

From the findings, majority of the respondents agreed to a large extent, that Information Communication and Technology adoption and use has promoted Job enrichment that has led to increase of decision making competences for teachers involved in some processes this was shown by a mean score of 4.02, other respondents also agreed that ICT Adoption has led to simplified teaching, while others also contends that ICT Adoption and use has led to the improvement of educational processes in the school as this was shown by a mean score of 3.89. By implication ICT Adoption has led to simplified teaching, improvement of educational processes in the school and Job enrichment which has led to increase of decision making competences for teachers involved in some processes.

4.4.2 Adoption of Information Communication and Technology on School Services

The study further sought to establish the extent of Adoption of Information Communication and Technology on the school services, the data collected were shown in the table 4.6 below;

Table 4.6 Adoption of Information Communication and Technology on school services

Response	frequency	Percentage
Not at all	21	19.27
To a small extent	12	11.01
To a moderate extent	16	14.68
To a large extent	37	33.94
To a very large extent	23	21.10
TOTAL	**109**	**100**

From the findings, majority 33.94% of the respondents reported that Information Communication and Technology has been adapted to a large extent, 21.10% of them reported that Information Communication and Technology has been adapted to a very large extent, 19.27% of the respondents reported that Information Communication and Technology has not

been adopted for use on school services, 14.68% of the respondents reported that Information Communication and Technology has been adopted to a moderate extent, 11.01% of the respondents reported that Information Communication and Technology has been adopted to a small extent. By implication Information Communication and Technology has been adopted for use in the school services.

4.4.3 Adoption of Information Communication and Technology on Service Automation

Further the study sought to establish the Adoption of Information Communication and Technology on service Automation, the data collected from the respondents were shown in the Table 4.7 below;

Table 4.7 Information Communication and Technology on Service Automation

Response	frequency	Percentage
Yes	98	89.91
No	11	10.09
TOTAL	**109**	**100**

From the findings majority 89.91% of the respondents reported that Information Communication and Technology has been adopted on service automation, while 10.09% of the respondents reported that Information Communication and Technology has not been adopted on the service automation. The findings imply that Information Communication and Technology has been adopted on services automations.

4.4.4 Extent of Adoption of Service Automation

Further the study sought to establish the extent of adoption of service Automation; the data collected were shown on the table 4.8 below;

Table 4.8 Extent of Adoption of service Automation

Aspect	Mean	STD Dev.
Existence of Computer Labs	3.65	1.097
Availability of Internet/Website services	2.89	1.987
E-learning (e.g. interactive physics or software)	3.99	1.900
Different automated educational services	4.01	0.009

From the findings majority of the respondents that different automated educational services has been implement to a very large extent as shown by a mean score of 4.01, further others contends that E-learning e.g. interactive physics or software has been automated to a large extent as this was shown a mean score of 3.99, it was also reported that service automation has led to the existence of Computer Labs as shown by a mean score of 3.65 while service automation has led to the availability of Internet/Website services as this was shown by a mean score of 2.86. By implication service automation has led to existence of Computer Labs, availability of Internet/Website services, E-learning such as interactive physics or software) and it has also led different automated educational services.

4.5 Levels of Computer Literacy

The second objective of the study focused on the level of computer literacy, the questions on this objective were analysed in the following sections;

4.5.1 Role of Information Communication and Technology and its effects in Teaching

The study sought to establish the role of Information Communication and Technology and its effects in teaching. The data collected were shown in the Table 4.9 Below:

Table 4.9 ICT and its Influence in Teaching

Response	frequency	Percentage
not at all	27	24.77
small extent	24	22.02
not sure	19	17.43
some extent	22	20.18
Large extent	17	15.60
TOTAL	**109**	**100**

From the findings 24.77% of the respondents reported that they were not aware of the role of Information Communication and Technology and its effects in teaching, 22.02% of the respondents agreed to a small extent that the adoption of Information Communication and Technology has effects on teachings,20.18% of the respondents reported that to some extent adoption of Information Communication and Technology has affected teaching,17.43% of the respondents were not sure on the Adoption of Information Communication and Technology and its effects on teaching, while only 15.60% of the respondents reported to a large extent that Adoption of Information Communication and Technology has influenced the teachings.

4.5.2 Familiarity with Computer Applications

The study sought to establish the familiarity of the respondents with computer Applications, the data collected were shown in the Table 4.10 below;

Table 4.10 Familiarity with Computer Application

Computer Applications	Mean	STD Dev
Word processing(e.g. word)	3.54	1.009
Databases(e.g. Access)	2.99	1.987
Spread sheets (e.g. Excel)	4.12	0.908
Internet	3.89	1.096
Email	4.01	0.123

From the findings, majority of the respondents agreed to a very large extent that they were familiar with the use of spread sheets (e.g. Excel) as this was shown by a mean score of 4.12, other respondents, others reported that they were familiar with internet to a large extent as was shown by a mean score of 3.89. Other respondents reported that they were familiar with Word processing (e.g. word) at an average extent as shown by a mean score of 3.54. Other respondents agreed averagely that they were familiar with Databases (e.g. Access) usage this was shown by a mean score of 2.99. By implication majority of the respondents were familiar with the use of Word processing (e.g. word), Databases (e.g. Access), spread sheets (e.g. Excel), internet and email.

4.5.3 Confidence in Computer usage

Further, the study sought to establish the confidence in computer usage, among the respondents; the data collected from the respondents were shown in the Table 4.11

Table 4.11 Confidence in Computer Usage

Response	Frequency	Percentage
Yes	98	89.91
No	11	10.09
TOTAL	**109**	**100**

From the findings, majority 89.91% of the respondents were confidence with the computer usage while 10.09% of the respondents were not confident on the usage of the computer. Implying that majority were confidence with the use of computer.

4.5.4 Comfort ability with the Computer components

The study sought to establish the comfortability with the computer components, the data collected were shown in the Table 4.12

Table 4.12 Comfortability with the computer components

	yes		no	
Comfortability with the following Computer components	**frequency**	**Percentage**	**frequency**	**Percentage**
use a memory stick to transfer data	67	61.47	42	38.53
install new software on a computer	90	82.57	19	17.43
install a printer	77	70.64	32	29.36
solve technical problems (e.g. computer that does not start properly	59	54.13	50	45.87
login to a network	49	44.95	60	55.05
add a shared folder on a network	80	73.39	29	26.61
make information on a network secure	75	68.81	34	31.19
none of the above	69	63.30	40	36.70

From the findings, majority s 82.57% of the respondents were confidence in installing new software on a computer,61.47% of the respondents were confident to use a memory stick to transfer data, 70.64% of the respondents were confident to install a printer, 54.13% of the respondents were confident to solve technical problems e.g. computer that does not start properly. 44.95% of them were confident to login to a network, 73.39% of the respondents were confidence to add shared folder on a network, 68.81% of the respondents were confident that they make information on a network secure. By implication majority of the respondents were confident in installing new software on a computer, to use a memory stick to transfer data, install a printer, solve technical problems e.g. computer that does not start properly and add shared folder on a network.

4.5.5 Information, Communication, Technology and Training

Further the study sought to establish from the respondents on the availability of Information Communication and Technology training on specific topics, the data collected were recorded on the table 4.13

Table 4.13 Information, Communication, Technology and Training

	yes		no	
Information Communication and Technology Training on the following Topics	frequency	Percentage	frequency	Percentage
schools administration	47	43.12	62	56.88
computer literacy	66	60.55	43	39.45
using subject specific software	94	86.24	15	13.76
use of television/radio resources	87	79.82	22	20.18
teaching Information Communication and Technology as a subject	57	52.29	52	47.71
finding and using resources from the Internet	39	35.78	70	64.22
planning lessons or projects that integrate Information Communication and Technology	73	66.97	36	33.03

From the findings 43.12% of the respondents, had acquired training on school administration, 60.55% of the respondents of the respondents had acquired training on Computer literacy, 86.24% of the respondents had acquired training on subject specific software, 79.82% of the respondents had acquired training on use of television/radio resources, 52.29% of the respondents had acquired training on teaching Information Communication and Technology Information Communication and Technology as a subject, 35.78% of the respondents had attained training on finding and using resources from the Internet, while 66.97% of the respondents had attained training on planning lessons or projects that integrate Information Communication and Technology. By implications majority of the respondents had attained training on schools administration, computer literacy, using subject specific software, use of

television/radio resources, teaching Information Communication and Technology as a subject, finding and using resources from the Internet and planning lessons or projects that integrate Information Communication and Technology.

4.6 Information, Communication, Technology and Training

4.6.1 Comfortability with Computer as a teaching and learning

The study sought to establish the comfortability with the computer as a teaching and learning resource. The data collected was shown in the following Table 4.14;

Table 4.14 Comfort ability with the computer

Response	frequency	Percentage
Not at all	13	11.93
Small extent	9	8.26
Not sure	12	11.01
Some Extent	10	9.17
Large extent	65	59.63
TOTAL	**109**	**100**

From the findings, 59.63% of the respondents reported that they were comfortable with Computer as a teaching and learning resource, to a large extent.11.93% of the respondents reported that they were not comfortable with the use of computer as learning and teaching resource.

4.6.2 Extent of Computer effectiveness as a Mode of student learning

The study sought to establish the extent of computer effectiveness as mode of students learning, the data collected were shown in the table 4.15 below;

Table 4.15 Extent of Computer effectiveness as a mode of student learning

Response	frequency	Percentage
Not at all	12	11.01
Small extent	8	7.34
Not sure	12	11.01
Some Extent	14	12.84
Large extent	63	57.80
TOTAL	**109**	**100.00**

From the findings 57.80% of the respondents reported to large extent that Computer effectiveness is a mode of student learning, 12.84% of the respondents agreed to some extent that computer effectiveness is a mode of student learning, 11.1% of the students were not sure that computer effectiveness is a mode of student learning, consequently 11.1% of the respondents reported that computer effectiveness is not a mode of student learning. 7.34% of the respondents reported that computer effectiveness is a mode of student learning to a small extent. By implication computer effectiveness is a mode of students learning.

4.6.3 Factors that shape Information Communication and Technology adoption

The study sought to establish factors that shape Information Communication and Technology adoption, the data collected were represent in the table 4.16 below;

Table 4.16 Factors that shape Information Communication and Technology adoption

Factors on Information Communication and Technology adoption and use	Mean	STDev
Intra-organizational agendas	3.94	1.098
Emotions	3.78	0.876
Organizational culture	4.09	1.876

From the findings, majority of the respondents strongly agreed that Organizational culture is a strong factor that influence Information Communication and Technology adoption and use this was shown by a mean score of 4.09, other respondents also agreed that Intra-organizational agendas influence Information Communication and Technology adoption and use while others also agreed that emotions influence Information Communication and Technology adoption and use as this was shown by a mean score of 3.78. By implication the following factors influence on the Information Communication and Technology adoption and use; Intra-organizational agendas, Emotions and Organizational culture.

4.7 Training Policies

Objectives of the study also sought to establish the training policies, that the organizations apply, Questions under this objective were analysed in the following sections;

4.7.1 Consequences of ICT adoption

The study sought to establish the consequences of Information Communication and Technology adoption, the data collected was recorded in the table below;

Table 4.17 Consequences of Information Communication and Technology adoption

Response	frequency	Percentage
Not at all	16	14.68
Small extent	8	7.34
Not sure	13	11.93
Some Extent	12	11.01
Large extent	60	55.05
TOTAL	**109**	**100.00**

From the findings, majority of the respondents 55.05% agreed to a large extent that Information Communication and Technology adoption has consequences, 14.68% of the respondents Information Communication and Technology adoption has no consequences, 11.93% o the respondents were not sure on the consequences of Information Communication and Technology adoption, 11.01% of the respondents agreed to some extent that Information Communication and Technology adoption has some consequences, 7.34% of the respondents agreed to a small extent that Information Communication and Technology adoption has with it some consequences. From the findings it can be implied that adoption of Information Communication and Technology has with it some consequences.

4.7.2 Information Communication and Technology Adoption training policies

Finally the study sought to establish the components of the Information Communication and Technology adoption training policies, the data collected was shown in the table 4.17 below;

Table 4.18 Component of ICT adoption training policies

Components of Information Communication and Technology Adoption training policies	Mean	STDev
Adoption, acceptance, and adaptation	3.98	1.987
Organizational assimilation and integration	3.70	0.897
Structure of curriculum	3.77	1.897
Institutional environment	4.05	0.879
Performance	4.00	0.765

From the findings majority of the respondents strongly agreed that institutional environment is a component of the Information Communication and Technology adoption training policies this was shown by a mean score of 4.05, other respondents also agreed that Performance is a component of Information Communication and Technology adoption training policies this was shown by a mean score of 4.00, Others agreed that Adoption, acceptance, and adaptation are components of Information Communication and Technology adoption this was shown by a mean score of 3.98.consequently Structure of curriculum was shown by a mean score of 3.77, and Organizational assimilation and integration as shown by 3.70. By implication, Adoption, acceptance, and adaptation, Organizational assimilation and integration, Structure of curriculum, Institutional environment and Performance are components of Information Communication and Technology adoption training policies.

4.8 Inferential Analysis

The section below presents coefficient of correlation, coefficient of determination, ANOVA and regression coefficient. Coefficient of correlation shows the relationship between the dependent variable and the independent variables, coefficient of determination shows the contribution of independent variables to the dependent variable, ANOVA tests the significance of the regression model while the regression coefficient shows the effect of unit increase independent variable to the independent variable.

4.8.1 Coefficient of Correlation

To compute the correlation (strength) between the study variables and their findings the study used the Karl Pearson's coefficient of correlation (r). The findings as shown in Table 4.1 below revealed that there was a positive correlation between ICT adoption and service automation as shown by a correlation figure of 0.557, even though the correlation is positive, the relationship between ICT adoption and type of service automation is not significant. It was also clear that there was a positive correlation between ICT adoption and level of computer literacy with a correlation figure of 0.512, even though the correlation is positive, the relationship between ICT adoption and computer literacy is not significant. It was also revealed that there was a positive correlation between ICT adoption and attitude with a correlation figure of 0.52, likewise even though the correlation is positive; the relationship between ICT adoption and attitude is not significant. Finally, a positive correlation between ICT adoption and training policies, with a correlation value of 0.538 was realized. Even

though the correlation is positive, the relationship between ICT adoption and training policies is not significant. This shows that there was a moderate correlation between ICT adoption and service automation, computer literacy, attitude and training policies. The lack of significance in the individual relationships could be due to interactive effects with the other variables.

Table 4.19 Correlation Coefficient

		ICT Adoption	Service Automation	Computer literacy	Attitude	Training policies
ICT Adoption	Pearson Correlation	1				
	Sig. (2-tailed)					
Service Automation	Pearson Correlation	0.557	1			
	Sig. (2-tailed)	0.3079				
Computer Literacy	Pearson Correlation	0.512	.320	1		
	Sig. (2-tailed)	0.1855	0.0194			
Attitude	Pearson Correlation	0.520	0.1846	0.1107	1	
	Sig. (2-tailed)	0.0023	0.1857	0.4300		
Training policies	Pearson Correlation	0.538	0.0072	0.2335	0.1027	1
	Sig. (2-tailed)	0.0422	0.9591	0.0925	0.4642	

4.8.2 Coefficient of determination

Coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable (ICT adoption) that is explained by all the four independent variables (Service automation, attitude, training policies and computer literacy). From the findings, 54.5percent ICT Adoption is attributed to combination of the four independent factors (Service automation, attitude, training policies and computer literacy) investigated in this study. A further 45.5 percent of ICT Adoption is attributed to other factors not investigated in this study. Therefore, there is a dare need for further research that should be conducted to investigate the other factors (45.5 percent) that contribute to the ICT Adoption.

Table 4.20 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.738	0.545	0.214	0.160

4.8.4 Regression Coefficient

Multiple regression analysis was conducted as to determine the relationship between academic performance and the four variables. As per the SPSS generated table 4.4

($Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$) becomes: $Y = 1.180 + 0.0498 + 0.017\ X_2 + 0.3209\ X_3 + 0.2527\ X_4$

Table 4.21: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.180	0.3303		0.5449	0.5881
Service automation	0.541	0.1530	0.0498	0.3731	0.0201
Computer literacy	0.507	0.1658	0.0170	0.1210	0.0262
Attitude	0.518	0.1502	0.3209	2.4461	0.0252
Training Policies	0.528	0.1398	0.2527	1.9406	0.0223

The regression equation above established that taking all factors into account all the independent variables constant at zero, ICT Adoption will be 1.180. The findings presented also shows that taking all other independent variables at zero, a unit increase in service automation will lead to a 0.0498 increase in ICT adoption; a unit increase in attitude will lead to a 0.017 increase in ICT Adoption; a unit increase in training policies will lead to a 0.3209 increase in ICT adoption This infers that training policies contribute most to ICT adoption followed by service automation then attitude contributed the least to ICT adoption.

CHAPTER FIVE
SUMMARY, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, discussions, conclusions and recommendations of the study findings from the questionnaires which were administered to the respondents. The chapter discusses the findings in relation to the literature review and the objectives identified for the study. The recommendations drawn were based on the outcomes of the study.

5.2 Summary of the Findings

On the service automation and its influence on the ICT adoption the findings revealed that that ICT adoption and use has promoted Job enrichment that has led to increase of decision making competences for teachers involved in some processes, further the study revealed that ICT Adoption and use has led to the improvement of educational processes in the school, also the study revealed that ICT has been adopted on service automation. On the level of computer literacy among the teachers, the study revealed that ICT adoption has effects on teaching approaches adopted by the teachers in secondary schools, also the study established that the level of familiarity with the computer applications such as word processing, database, spreadsheets, internet and email among the students was average.

On the ICT training the study established that ICT training has been offered on school administration, computer literacy, and subject specific software, use of television and radio resources, teaching ICT and planning lessons. On computer attitudes it was revealed that computer effectiveness is a mode of students learning further the study established thatOrganizational culture is a strong factor that influences ICT adoption and use also Intra-organizational agendas influence ICT adoption and use. On the training policies the study established that ICT adoption has with it consequences, that components of ICT adoptions are Adoption, acceptance, and adaptation, Organizational assimilation and integration, structure of curriculum, institutional environment and performance.

5.3 Discussions of the Findings

The findings of the study answered the research questions since the factors influencing the use of information technology by the teachers in Kenya. The discussion and related literature were presented for each of the four variables of the study.

5.3.1 How Levels of computer literacy influence Information Communication and Technology use by teachers.

The study matches Prestride, (2012), according to him computer aided teaching is the most appropriate skill required of a teacher, unfortunately, it is the least possessed by many. This may be because it is barely been part of their training course. Prestride, (2012)) outlined some of ICT packages required of a secondary school teacher as data processing, word processing, use of internet, use of spreadsheet, use of presentation software like PowerPoint and e-mail. These ICT packages are important to teachers because they assist in creating lesson plans, analysing and setting students' tests, acquiring new knowledge and presenting lesson in a clear way among others.

The study established that majority 24.77% of the respondents were not aware of the role of ICT and its effects in teaching, 22.02% of the respondents agreed to a small extent that the adoption of ICT has effects on teachings,20.18% of the respondents reported that to some extent adoption of ICT has affected teaching,17.43% of the respondents were not sure on the Adoption of ICT and its effects on teaching, while only 15.60% of the respondents reported to a large extent that Adoption of ICT has influenced the teachings. From the findings, majority of the respondents agreed to a very large extent that they were familiar with the use of spread sheets (e.g. Excel) as this was shown by a mean score of 4.12, other respondents, others reported that they were familiar with internet to a large extent as was shown by a mean score of 3.89. Other respondents reported that they were familiar with Word processing (e.g. word) at an average extent as shown by a mean score of 3.54. Other respondents agreed averagely that they were familiar with Databases (e.g. Access) usage.

5.3.2 Extent to which Attitude influences the use of Information Communication and Technology use by teachers in Kenyan schools

The study established that majority of the respondents have reported to be comfortable with use of computer applications in teaching, the study established that computer effectiveness is a mode of students learning, further the following factors influence on the ICT adoption and use; Intra-organizational agendas, Emotions of teachers and Organizational culture of the schools and how they perceive the use of ICT in teaching. This matches (Clark, 2001). Attitudes towards computers influence teachers' acceptance of the usefulness of technology,

and also influence whether teachers integrate ICT into their classroom (Clark, 2001). Huang and Liaw (2005) also state that among the factors that affect the successful use of computers in the classroom, teachers' attitudes towards computers play a key role. Research of van Braak et al. (2004) also supported that class use of technologies was affected by teachers' attitudes toward computers in education.

5.3.3 Influence of Availability of Training policies on Information Communication and Technology use by teachers in Schools

The study established that adoption of ICT has with it some consequences; the study established that adoption, acceptance, and adaptation of ICT policies, Organizational assimilation and integration of ICT, Structure of curriculum, Institutional environment and Performance are components of ICT adoption training policies in schools. Most schools had policies that incorporated ICT in learning while a few actually had the curricular in their schools. Policy leadership is key to any successful development strategy, particularly if these efforts are to contribute to economic and social transformation. For example in Finland, successful development was guide by a clear vision of how the availability of new technologies could increase economic productivity, improve the quality of life and enrich the culture (Kozma, 2005)

5.3.4 How Service Automation influence the use of ICT by teachers in schools.

The study sought to find out types of service automation and their influence on ICT use. This matches Campbell (Alampay, 2006). Access to ICT is a first and necessary step in the integration process even though mere access will not automatically lead to use of ICT for teaching and learning. According Campbell the digital divide refers to "situations in which there is a marked gap in access to or use of ICT devices".The study revealed that service automation has led to ICT adoption and use by teachers in schools has hence promoted Job enrichment that has led to increase of decision making competences for teachers involved in some educational processes, further the study also established that ICT Adoption has led to simplified teaching, while others also contend that ICT Adoption and use has led to the improvement of educational processes in the school, it was also established that ICT has been adapted it was established that ICT has been adopted on service automation, further more service automation has led to existence of Computer Labs, availability of Internet/Website services, E-learning such as interactive physics or software and it has also led different automated educational services.

The study concludes that majority has familiarized with the use of Word processing, Databases, spread sheets internet and email. Majority of the respondents were confident in installing new software on a computer, to use a memory stick to transfer data, install a printer, solve technical problems e.g. computer that does not start properly and add shared folder on a network. The study established that majority of the respondents had attained training on schools administration, computer literacy, using subject specific software, use of television/radio resources, teaching ICT as a subject, finding and using resources from the Internet and planning lessons or projects that integrate ICT.

5.4 Conclusions of the study

The study concludes that majority of the respondents agreed to a very large extent that they were computer literate hence familiar with the use of spread sheets e.g. Excel others were familiar with internet to a large extent while Other respondents reported that they were familiar with Word processing (e.g. word) at an average extent. Other respondents agreed averagely that they were familiar with Databases (Access) usage. The study also concludes that that majority of the respondents were comfortable with the computer application, the study established that computer effectiveness is a mode of students learning, further the following factors influence on the ICT adoption and use; Intra-organizational agendas, Emotions and Organizational culture. The study concludes that ICT adoption and use has promoted Job enrichment and has led to increase of decision making competences for teachers involved in some educational processes, further the study also concludes that ICT Adoption and use has led to simplified teaching, while others also contend that ICT Adoption and use has led to the improvement of educational processes in the school, it was also concluded that ICT has been adapted it was established that IT has been adopted on service automation.

5.5 Recommendations

It is evident that service automation, levels of computer literacy, attitude on computer use, and training policies on ICT influence the use of information communication and technology by teachers in Kenyan schools. The study found out that all the identified factors do influence the use of information communication and technology. Following the finding of this study, therefore, the researcher recommends that there is need to address these factors before and during the process of introducing use of Information, communication and technologies in

schools. Technological officers taxed with the responsibilities of introducing technologies in schools and teaching should first explore the strengths, limitations or otherwise of these factors in a particular case of teaching before introducing new technologies to the institutions. Computer services through practical on subject demonstrations and practical's should be enhanced. Teachers should be educated and made aware of the consequences of the adoption of the new technologies in communication and teaching before they engage in them. Policy makers and managers of technological approaches should always make appropriate ict educational policies and programs to deal with the factors identified in order to make the new technologies acceptable and adopted by the teachers and learners. Further, there is need for both the central and learning institutions to invest in technological education and training especially in the area of computer skills, which the researcher found key to adopt new communication technologies in schools. It is also recommended that there is need for both the governments and learning institutions to avail financial support (credits) to learners or students in institutions in order to increase access to computer services and as a result maximise adoption of the new communication technologies.

5.6 Suggestions for further Studies

Teachers in Kenya are yet to fully adopt use of ICT in teaching in schools.

The study of factors influencing use of information communication and technology by teachers in Kenyan schools was carried out in Kasarani District. The researcher recommends that similar studies be carried out in different locations in the country and different ecological zones to establish the factors influencing adoption and use of Information, communication and technology by teachers in schools for comparison purposes. The researcher further suggests that further studies involving private schools should also be carried out to establish whether there is a variation in the adoption and use of communication technology by teachers in schools between public and private schools respectively.

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APPENDIX I

LETTER OF TRANSMITTAL OF DATA COLLECTION INSTRUMENTS

Jacqueline Nyawanda
P.O. Box 59697 00200
Nairobi

23rd June, 2014

Dear Respondent,

RE REQUEST FOR RESEARCH DATA

I am a post graduate student at University of Nairobi pursuing a course leading to a Master's Degree in project Planning and Management. In partial fulfillment of the requirements of this degree programme, I am carrying out a research project titled, 'Factors affecting the use of ICT by teachers in Kenyan schools: A case of secondary schools in Nairobi.'

You are kindly requested to assist in the data collection by filling this questionnaire attached. This is just a study for academic purposes. It has no bearing on anyone or company. Your confidentiality is guaranteed.

Your assistance and co-operation will be highly appreciated.
Yours Faithfully,

Jacqueline Nyawanda
Mobile No. 0722510130

APPENDIX II
QUESTIONNAIRE

SECTION A: GENERAL INFORMATION

1. Name of School.

   [ ] …….

2. Gender of the respondent

   [ ] Male

   [ ] Female

3. Age in years of respondent

   [ ] 26-35

   [ ] 36-45

   [ ] 46-50

   [ ] Above 50

4. Years worked at the organization?

   [ ] Below 1 year

   [ ] Between 1- 2 years

   [ ] Between 3 - 5 years

   [ ] Over 5years

5. What is your position in the organisation?

   [ ] Top Management

   [ ] Middle Level

   [ ] Junior Staff

SECTION B: SERVICE AUTOMATION

6. On a scale of 1 - 5 where 1 = Not at all, 2 = to a small extent, 3 = to a moderate extent, 4 = to a large extent, 5 = to a very large extent, answer the question by clicking the appropriate box in the right of each question. **a)** To what extent has the adoption of ICT influenced the Automation of the following services in your school**?**

ICT Adoption and use	**1**	**2**	**3**	**4**	**5**
simplified teaching					
Improvement of educational processes in the school					
Job enrichment increase of decision making competences for teachers involved in some processes					

b) .To what extent has your school adopted ICT in carrying out its school services?

1. Not at all ( )
2. To a small extent ( )
3. To a moderate extent ( )
4. To a large extent ( )
5. To a very large extent ( )

Please tick as appropriate.

7. Has the adoption of information technology resulted in service automations in your school?

Yes ( ) No ( )

8 To what extent has service automations been adopted in your school with respect to the following services?

Aspect	**1**	**2**	**3**	**4**	**5**
Existence of Computer Labs					
Availability of Internet/Website services					
E-learning (e.g. interactive physics or software)					
Different automated educational services					

SECTION C: LEVEL OF COMPUTER LITERACY

6. To what extent do you understand the roles of I.C.T and its effect in teaching? Please rank between 1-5 where 1-not at all, 2-small extent, 3-not sure, 4-some extent, 5- large extent.

Not at all (1)	Small Extent (2)	Not Sure (3)	Some Extent (4)	Large extent (5)

7. To what extent are you familiar with the following applications

	1	2	3	4	5
Word processing(e.g. word)					
Databases(e.g. Access)					
Spread sheets(e.g. Excel)					
Internet					
Email					

8. Do you feel confident to use a computer on your own?

   Yes ( ) no ( )

9. Indicate which of the following you can do by yourself. (indicate with x all that applies)

(i)use a memory stick to transfer data	
(ii)use a memory stick to transfer data	
(iii)install new software on a computer	
(iv)install a printer	
(v)solve technical problems (e.g. computer that does not start properly	
(vi)login to a network	
(vii)add a shared folder on a network	
(viii)make information on a network secure	
(ix)none of the above	

10. Have you received ICT-related training covering the following topics?

(Select all that apply with an X)

(i)schools administration	
(ii)computer literacy	
(iii)using subject specific software	
(iv)use of television/radio resources	
(v)teaching ICT as a subject	
(vi)finding and using resources from the Internet	
(vii)planning lessons or projects that integrate ICT	

SECTION D: COMPUTER ATTITUDES

11. Please rank between 1-5

Not at all (1)	Small Extent (2)	Not Sure (3)	Some Extent (4)	Large extent (5)

15. The computer is not an effective mode to student learning because it is not easy to use.

Not at all (1)	Small Extent (2)	Not Sure (3)	Some Extent (4)	Large extent (5)

16. To what extent do you agree that the following are the factors that shape ICT adoption, use, and outcomes? Please rank between 1-5 was 1- strongly disagree, 2-disagree, 3-undecided, 4- agree, 5-strongly agree.

Adoption and ICT use	1	2	3	4	5
Intra-organizational agendas					
Emotions					
Organizational culture					

In your opinion what other factors that influence your attitude in use of computer for teaching.....

SECTION E: TRAINING POLICIES

17. To what extent do you understand the consequences of ICT adoption and use in teaching? Please rank between 1-5 (5 being the highest)

Not at all (1)	Small Extent (2)	Not Sure (3)	Some Extent (4)	Large extent (5)

18. To what extent do you agree that the following are components of ICT adoption training policies?

	1	**2**	**3**	**4**	**5**
Adoption, acceptance, and adaptation					
Organizational assimilation and integration					
Structure of curriculum					
Institutional environment					
Performance					

In your opinion what other consequences would you add to the above?

……...

……...

APPENDIX III
BUDGET

Item Description	**Quantity Description**	**Cost - Kshs**
Stationary		
Photocopy papers	Rim	4100
Spiral Binding	Pieces	450
Pens	Pieces	150
Miscellaneous stationery	Lot	2300
Subtotal		**7000**
Equipment requirement		
3G Internet Modem	Pieces	2000
Subtotal		**2000**
Personal requirements		
Cost of internet and airtime	Units	10000
Transport		15000
Subtotal		**25000**
Grand Total		**34000**

APPENDIX IV
KREJCIE AND MORGAN TABLE

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Note: "N" is population size
"S" is sample size.